PRINTED BY AUTHORITY OF THE LEGISLATIVE ASSEMBLY OF BRITISH COLUMBIA.

LEGISLATIVE LIBRARY
WITHDRAWN

BRITISH COLUMBIA BUREAU OF MINES.

BULLETIN No. 1, 1909.

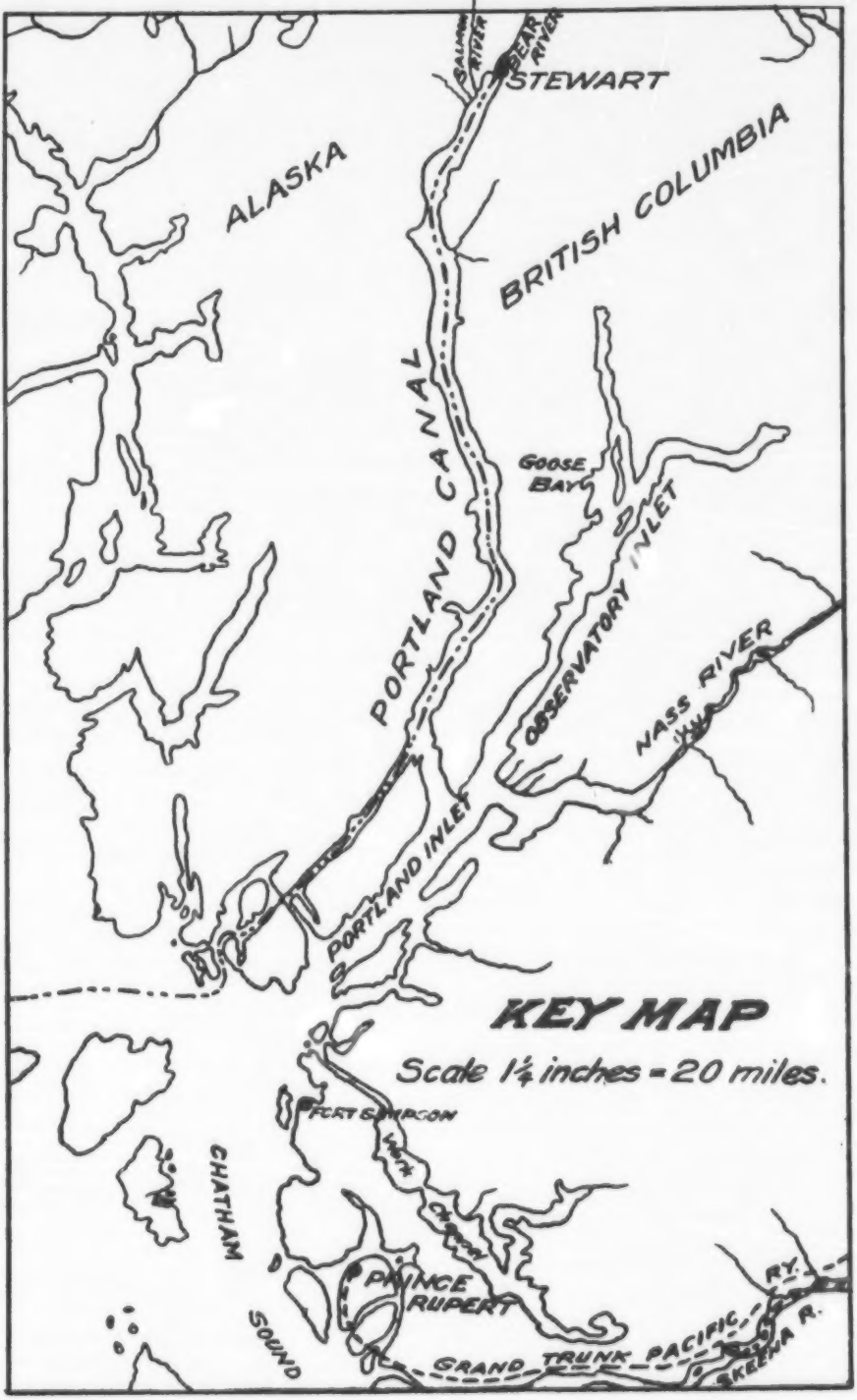
MINERAL LOCATIONS, PORTLAND CANAL DISTRICT,

IN THE

SKEENA MINING DIVISION.

—BY—

HERBERT CARMICHAEL,
GOVERNMENT ASSAYER.


SALMON RIVER
BEAR RIVER
STEWART
ALASKA
BRITISH COLUMBIA
PORTLAND CANAL
GOOSE BAY
OBSERVATORY INLET
NASS RIVER
PORTLAND INLET
KEY MAP
Scale 1¼ inches = 20 miles.
FORT SIMPSON
CHATHAM SOUND
PRINCE RUPERT
GRAND TRUNK PACIFIC RY.
SKEENA R.

PORTLAND CANAL DISTRICT.

—:o:—

REPORT OF HERBERT CARMICHAEL, GOVERNMENT ASSAYER.

Portland canal is the most northerly inlet on the coast of British Columbia, and forms the boundary between that province and Alaska. This International boundary, the position of which was definitely decided upon some few years ago, has now, in this portion of it at least, been laid out on the ground, and its position clearly marked by monuments or by a cutting through the forests where such occur. The settlement of this boundary has relieved claim owners of much uncertainty as to which country their claims lie in, and should stimulate development on both sides of the line. The canal, or fiord, communicates with the open sea at Dixon entrance, and from that point runs nearly due north a distance of 55 miles to its head. It possesses few and indifferent anchorages, since the shores on either side are precipitous mountains with, in places, peaks which rise almost perpendicularly to heights of 6,000 feet. About 35 miles from the head of the canal, on the east side, is Maple bay (marked Maple point on the chart), a small bay affording good shelter but with rather deep anchorage. The two rivers, the Bear and the Salmon, at the head of Portland canal, are separated by a high bare ridge of mountain that forms the International boundary line, trending off to the west. On the east side of the valley of Bear river a mountain range extends in an east and west direction, the highest peak of the range, mount Disraeli, being a snow-clad pinnacle 7,000 feet high. The valley of the river is about a mile wide, composed of gravel and sand dotted with cottonwood and alder trees. It extends easterly in a straight line, with a gradual rise, for ten miles, until an elevation of 400 feet is attained. From this point the river and creeks rise more rapidly, becoming mountain torrents. With very little work a good waggon road could be made up the valley for ten miles or more. An excellent bridge, some 1,300 feet long, has been built across Bear river by the Provincial Government. This bridge has been of great aid in opening up the district, there being now a fairly good waggon road for six miles from tide-water, and further work is being done which will enable waggons to reach a point four miles farther up the valley.

Communication up Portland canal is maintained weekly by a steamer from Prince Rupert. There is an hotel at Stewart, at the head of the canal. Attention was first drawn to Portland canal when, on the 4th of May, 1898, a party of 64 persons from Seattle landed at the head to look for placer diggings at the source of the Naas river. Some 21 of the party went over the divide from Bear river and down the Naas river and struck "colours," but no pay placers. Some of the men still believe that if the "grub" had held out they would have found diggings worth staying with. Two or three of the party wintered on the canal and staked in the spring of 1899 what is now the *Roosevelt* claim, on Bitter creek, while the *Stewart* claim, on American creek, was staked in 1902, and the principal claims on Glacier creek in 1905-06. That part of the district included in the watershed of Glacier creek was examined by the Government Assayer in 1906, and since then the results following development work have been distinctly encouraging, the older properties having opened up ore bodies of a good shipping grade, while new claims have been located on very promising surface showings.

The country rock on the east side of Bear river is an argillite* traversed by felsitic dykes, and in this argillite rock fissures can be traced for miles. These fissures are for the most part

* This is a fine-grained, iron gray rock having a distinct schistose structure. It is rusty along the joint planes. The microscopic section shows fine parallel lines of minute grains of magnetite in a very fine granular base of a dull gray colour. There are also present a few larger grains of pyrite and of feldspar. It seems to be a very fine-grained sediment, perhaps altered by proximity to some igneous intrusion. It might be called a ferruginous argillite.

filled with quartz carrying values principally in gold, silver and lead, with sometimes a little copper. These form the quartz veins of the district.

There are places where, through movement, these fissures have been filled with the slate country rock, leaving very little room for the silicious mineral-bearing solutions which came up at a later period. The veins at these points present a brecciated structure, with often only a slight quartz cementation and carrying low values, but on further prospecting the argillite has given place to quartz again and the former good ore values have returned.

This fact encourages the further prospecting of claims which show now only a fissure largely filled with brecciated slate, but there is reasonable assurance that if further drifting on such well-defined fissures is continued quartz will come in and yield pay ore.

The regularity and permanence of these veins are very encouraging. There do not appear to be any serious faults and, in one case at least, a vein can be traced for over two miles; the felsitic dykes present the same regularity and run parallel with the veins for long distances.

No rock in place is to be seen on the floor of the valley below Bitter creek, the depression being filled with coarse gravel. On the west side of the valley the country rock is igneous, mostly granitoid near the head of the canal, but changing towards the north. These rocks will be better classified when rock sections have been made. The mode of occurrence of ore differs on this side of the valley from that on the south side, but the same relatively high gold values are maintained.

The majority of the mineral claims so far recorded have been located on the different branches of Glacier creek, which flows into Bear river four and a half miles from the head of Portland canal. The position of the different creeks and claims can be seen by referring to the sketch map herewith. There is now a very good waggon road from tide-water to Glacier creek, over which supplies can be hauled to, or ore from, this camp, and the flat at the mouth of the creek forms an excellent base from which to distribute supplies or collect ores from the different branches of Glacier creek. The most development work has been done on the south fork of Glacier creek, and properties on this branch will be first described.

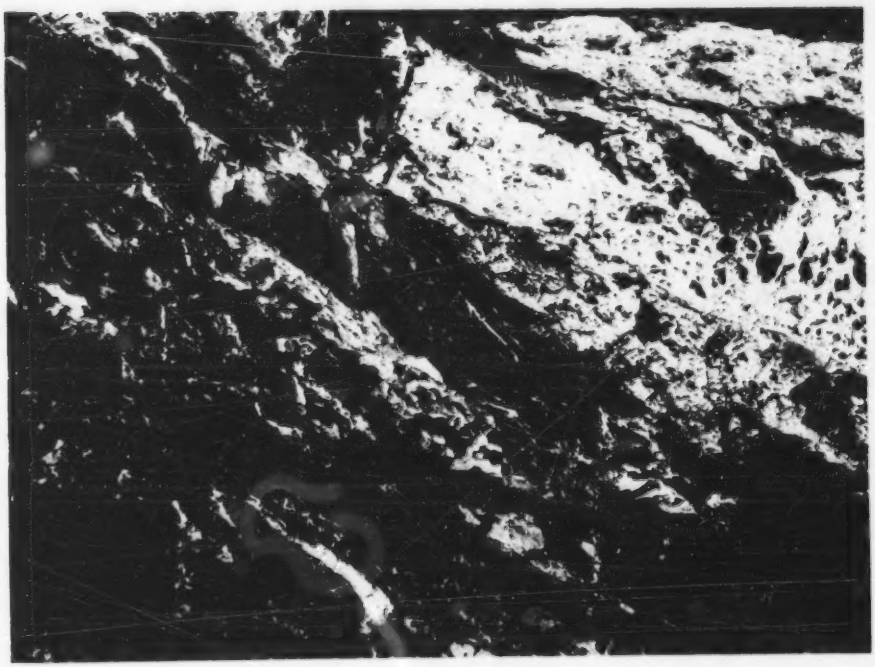
South Fork of Glacier Creek.

Head office, Duncan, B. C.; mine office, Glacier creek, Portland canal.

Portland Canal Mines, Ltd. The company has acquired the following claims, viz.: The *Gipsy*, *Extension*, *Herbert*, *Mayflower*, *Mosquito*, *Richard II.*, *Barney*, *Sadie*, *Eclipse*, *Little Joe Fraction*, *Little Joe* and *Lucky Seven*, all situated on the south fork of Glacier creek. The principal work has been done on the *Lucky Seven* and *Little Joe*, and since these claims were last reported on by the Mines Department a large amount of development work has been done, principally on the main vein, which runs through the *Lucky Seven*, *Little Joe* and other claims. This vein is a fissure in the country rock which has been filled with an ore-bearing solution of quartz. In places the fissure is entirely filled with quartz; in others a considerable quantity of the country rock is included in the vein, which at these points has a marked brecciated structure. At places in the tunnels the fissure has been so filled with shattered country rock as to leave little room for mineral-bearing solutions, but within a short distance this gives place to a complete quartz filling, yielding a large body of high grade ore. The country rock, locally called a slate, is a ferruginous argillite and there are two felsitic dykes in close proximity to the vein and having the same strike and dip.

Since the last report the original tunnel (now known as No. 2), which was started a little below the vein, was continued till the vein was reached, when, turning slightly to the south-east, the vein has been followed for the entire length of the tunnel, or 125 feet. This tunnel is in good ore nearly all the way, the vein having an approximate width

BASIN OF SOUTH FORK, GLACIER CREEK.



OPEN CUT ON LITTLE JOE VEIN.
Showing brecciated nature of vein.

of 10 feet. The mineralisation consists of iron pyrites, carrying gold, argentite, native silver, and high grade galena. A general average of the dump was taken for the company by Mr. W. J. Elmendorf, mining engineer, and gave the following values:—Gold, 0.3 oz.; silver, 11.9 oz.; lead, 5.05 %. That there are very rich ore pockets there can be no doubt, as samples carrying high values can easily be picked out. One rich streak, 15 inches wide, assayed as follows:—Gold, 1.2 oz.; silver, 48.8 oz.; lead, 4.29 %. A noteworthy fact is that the best pay streak is in the centre of the vein.

At 70 feet from the portal of this No. 2 tunnel a crosscut is being run to connect with a raise from the tunnel below. Simultaneously with No. 2 tunnel, No. 1 tunnel has been run in on the vein, the portal being 110 feet east of No. 2 tunnel and 39 feet above it. In this drift the vein shows rather more movement than in the tunnel below, the vein altering slightly in both dip and strike, but coming back again to the same general strike. At 65 feet in the vein takes a sharp turn to the south-west, and was followed by a drift 32 feet long, but the ore-body coming back to the original strike, it was decided to continue the drift from the 65-foot point of departure in a southerly direction. In a short distance the main ore body was again picked up, and the face is in good ore at 162 feet in.

The mineralisation is the same as in No. 2 tunnel, but high-grade pockets and streaks of ore are more plentiful, native silver being much in evidence. Average assays from this tunnel discarding the high grade samples, may be taken as:— Gold, 0.25 oz.; silver, 14.6 oz.; lead, 5.8 %. Higher grade samples gave the following assays:—Gold, 0.98 oz.; silver, 293.1 oz.; lead, 0.82 %.

Following the vein in an easterly direction as it goes round the hill, several open cuts have been made on its outcrop. The ore here has been subject to surface alteration and lead carbonate replaces the galena. What is known as the upper open cut is 359 feet east and 105 feet vertically above No. 1 tunnel. The vein at this point is shown to be 10 feet wide and well mineralised. Average assays of 8 feet of this ore-body by Mr. Elmendorf gave: Gold, 0.15 oz.; silver, 3.0 oz.; lead, 2.4 %.

The lower open cut is 61 feet east of No. 1 tunnel and 17 feet above it. The vein is from 8 to 10 feet wide and with a mineralization similar to the upper open cut. Samples of very high grade ore are easily obtained, but Mr. Elmendorf gives the average obtained by him as follows: Gold, 0.2 oz.; silver, 20.0 oz.; lead, 6 %.

It is intended that No. 3 drift shall be the main working tunnel of the mine. The portal is 175 feet north-west of No. 2 tunnel and 55 feet lower down the hill. The entrance is but a short distance from the site selected for the ore bunkers and for the upper terminal of the aerial tramway, at an altitude of 2,400 feet above sea level. This tunnel follows the general strike of the vein in an easterly direction for 245 feet, but appears, however, to be more on the foot-wall side of the vein and so below the main pay chute. For the first 140 feet the fissure includes a lot of crushed country rock, with quartz, carrying rather erratic values. At 200 feet in, free silver is found, and 20 feet further high grade stringers of quartz, 10 inches wide, were followed by a drift to the north for 20 feet. At the end of No. 3 drift, or 240 feet in, a raise has been started on a slope of 45°, to connect with the level above, from which a short cross-cut is being run. At 20 feet vertically above the lower level the raise cuts diagonally the main ore chute before mentioned, with approximately the same values.

While the pay chute does not show up so strongly in No. 3 tunnel, yet high grade ore is found on what appears to be undoubtedly the same vein in the *O. K. Fraction* at 600 feet lower altitude, so that while the values will undoubtedly vary with different parts of the vein, there is nothing to indicate that they will decrease with depth.

The *Gipsy* claim, lower down the hill, has been located on what may prove to be an offshoot from the main vein. A small stream has uncovered a quartz vein 2 feet wide along the

intrusion of a porphyritic dyke, which has cut the country rock with a strike of N. 50° E. The dip of the vein is 65° to the S. E. A shaft was sunk on this showing to a depth of 75 feet, but was full of water when visited. The quartz vein matter is well mineralised with iron pyrites and galena, and is reported to have given from 1½ to 4 oz. of gold per ton. Mr. Elmendorf gives the following as an average of 3 feet across the ore outcrop: Gold, 1.2 oz; silver, 5.4 oz.; lead, 5 %. Samples taken by the Government Assayer and assayed in the Government Assay office gave the following returns:—Gold, 2.1 oz.; silver, 14.7 oz.; lead, 12.8 %; copper, none. The vein is reported to be 6 inches wide in the bottom of the shaft and to carry good values, but work was discontinued at this point in favour of pushing on development on the *Little Joe* and *Lucky Seven*.

The company have been advised that they have enough ore assured to warrant them in building an aerial tramway and concentrator. The tramway right of way and concentrator site have been cleared, and the erection of both tram and concentrator are being pushed to completion as rapidly as possible. The tramway runs from the flat at the mouth of Glacier creek to just below No. 3 tunnel, a distance of 8,500 feet, and a difference in altitude of 2,100 feet. The concentrator will be built immediately below the lower tramway terminal, the whole plant being well situated for easy and cheap handling of ore.

One thousand inches of water have been recorded on Glacier creek and the water will be taken round the hillside by a short flume to Pelton wheels at the concentrator. The flume-bed has been graded, the head obtainable will be 100 feet, and the first wheel to be installed will develop 60 h.p. It is also proposed to put in a 6-drill compressor.

The concentrator will have a capacity of 50 tons per day, but the crushing end will be sufficiently large to permit of doubling the rest of the plant if necessary. The equipment will consist of a Sturtevant crusher, 2 sets of rolls, 4 jigs, a Lane mill, 1 Overstrom and 1 Wilfley table, and 2 Frue vanners.

The hauling of the concentrates 4½ miles to tide-water presents little difficulty. There is a fine grade for a waggon road or a sleigh road in winter, but it is likely that a tram road will be constructed up the valley, which will still further cheapen transportation.

The Portland Canal Mining and Development Co., Ltd., is to be congratulated on the success which has followed its efforts to develop a mine in this section, and the favourable report of Mr. Elmendorf is fully borne out by an examination of the ground.

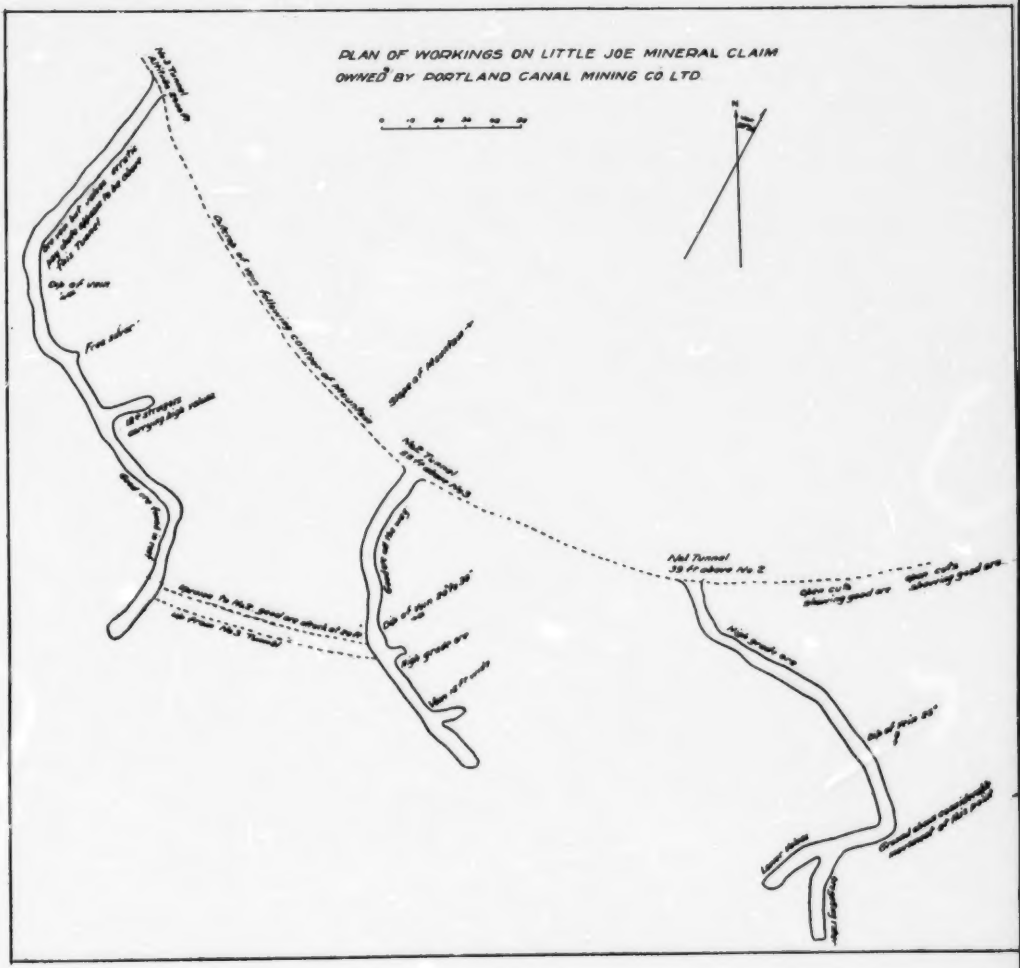
There seems every reason to believe that the main vein of the Portland Canal Mining Co. follows right round the basin of the south fork of Glacier creek in a south-easterly direction, disappearing under the glacier from which this fork of the creek is fed. Thence to the north it follows down the hill, crossing Glacier creek some distance below the Forks and follows northward a general zone of fracture or movement in the country rock. This vein may fairly be said to have been traced at least three miles, claims having been located on outcrops for about this distance.

Matheson and Rudge's Claim.

Adjoining the *Little Joe* to the south, Matheson and Rudge have located a claim on what appears to be a continuation of the *Little Joe* vein. A tunnel has been run in 18 feet, cutting a quartz vein which is strongly mineralized with iron pyrites and showed a brecciated structure. The dip and strike are approximately the same as in the *Little Joe*, but enough work has not been done to determine the width of the vein, though it may be taken as about 10 feet, averaging $4 in gold across the face.

Cook and Dobson's Claim.

This property is situated to the east of the Matheson and Rudge claim and is supposed to be on a continuation of the *Little Joe* vein. Owing to the precipitous nature of the ground, this claim cannot easily be reached from the *Little Joe* claim and was not visited, but it is reliably


PLAN OF WORKINGS ON LITTLE JOE MINERAL CLAIM
OWNED BY PORTLAND CANAL MINING CO LTD
0 10 20 30 40 50
N
Adit Tunnel
Outcrop of the Hallowell contact on Mountain
Slope of Mountain
Face of Tunnel
Adit Tunnel
No 1 Tunnel
Adit Tunnel
No 2 Tunnel
Open cut showing good ore
Open cut showing good ore
High grade ore
Face of Tunnel
Lower Adit
Ground slope Hallowell contact on Adit Tunnel
Face of Tunnel

reported that short tunnels have opened up a quartz vein similar to that seen on the Matheson claim adjoining. The property is best reached by following the main trail up the south fork of Glacier creek.

From the last-mentioned claim, the outcrop of the *Little Joe* vein appears to swing round the head of the south fork of Glacier creek in a north-easterly direction, following the contour of the basin and outcropping in a spectacular manner on the *Jumbo* claim.

Jumbo. The *Jumbo* claim, owned by Sam Gurley and R. B. Dodge, is reported to have been bonded to other parties. It is situated at the headwaters of the south fork of Glacier creek, at an altitude of 2,190 feet, at a distance of about 3½ miles from Bear river. This quartz vein outcrops on a bluff 100 feet high, and can be seen a long distance away. It dips into the hill at an angle of 22° and shows on the diagonal a mineralised face 40 to 50 feet wide, the mineralisation consisting of lead carbonate and galena, with iron pyrites. Examination of this face is distinctly dangerous at the present time, owing to the overhanging and broken nature of the rock, slabs of quartz of a ton weight being ready to drop at any time. In fact, there are tons of the ore now lying below the bluff which have fallen from it. Very little work had been done since the property was last visited, but it is certainly worth more vigorous development.

Average samples of the good ore gave the following assay:—Gold, 0.03 oz.; silver, 47.2 oz.; lead, 69.2 %; zinc, 1.5 %.

Hallie. This claim is owned by Ike Thomson, of Stewart, B. C., and is situated on the south branch of Glacier creek, a short distance above the Forks. At this point, where the rocky banks of the creek come close together and rise abruptly, the creek is seen to cut through a quartz vein in what is locally known as the "slate formation." This quartz vein has been prospected on the right bank of the creek by a tunnel into the hillside, 22 feet long, and by several open cuts farther up the hill, which rises at a slope of 45°. The tunnel runs in on the strike of the vein, N. 45° E., dip 10° S. E.; the vein is from 6 to 8 feet wide, showing a brecciated structure, and is well mineralised with iron pyrites, with in some places solid pyrites, for 8 to 10 inches in width, carrying gold and silver values; the vein also carries small values in copper. Samples taken assayed as follows:—Gold, 0.12 oz.; silver, 6.0 oz.; copper, 0.8 %.

Apex. The *Apex* mineral claim, owned by D. J. Rainie, of Stewart, B. C., is on the top of the divide between the south and middle forks of Glacier creek, at an altitude of 2,800 feet. Little work has been done on this claim beyond a few shots, which show a quartz mineralisation, several feet wide, in a greenstone country rock, carrying some iron pyrites; strike, approximately E. & W. The claim has only been located lately and sufficient work has not yet been done to demonstrate its value.

Middle Fork of Glacier Creek.

Evening Sun. The *Evening Sun* mineral claim is owned by Rush & Baggs, of Stewart, B. C., and is reached by following a trail up the middle forks of Glacier creek. The mine cabin is at an altitude of 1,950 feet, some 50 feet above the creek on the south side, the claim being on the opposite side of the creek. The bank rises at an angle of 40°, and, at 250 feet above the creek, a tunnel, 64 feet long, has been run into the hillside on the strike of the vein, which is N. 37° E., the dip being vertical with true and well defined walls. A fissure in a greenstone country rock, 4 feet 6 inches wide, is seen to be filled with felsitic material interbanded with barite seams from 2 to 16 inches wide. The mineralisation is largely pyrites, with some galena and a little gray copper. A sample across the face of the tunnel is reported to have given $10, principally in silver, while the solid iron pyrites gave 89 oz. in silver and 0.2 oz. in gold. Samples taken from the baritic portion of

the vein gave the following assay:—Gold, 0.12 oz.; silver, 157.4 oz.; copper, 0.8 %. About 75 feet to the left of the main vein a smaller but similar vein has been prospected by a series of open cuts.

Columbia.

The *Columbia* claim, also owned by Rush and Baggs, is on the opposite side of the creek from the *Evening Sun* claim, where a small stream follows the course of a fissure down the hillside. At 300 feet above the creek a tunnel has been run 19 feet into a brecciated quartz vein in a greenstone country rock, 5 feet wide with good walls, the strike being S. 35° W. and the dip vertical. It is probable that this is the same vein as that seen across the creek in the *Evening Sun*. The vein filling is similar, with the difference that there is more quartz and some blende, and the vein matter also encloses more brecciated country rock. There is an 8 to 10 inch seam of galena which is reported to run as high as 100 oz. to 200 oz. in silver; a streak of blend also runs 76 oz. in silver.

Lake View Group.

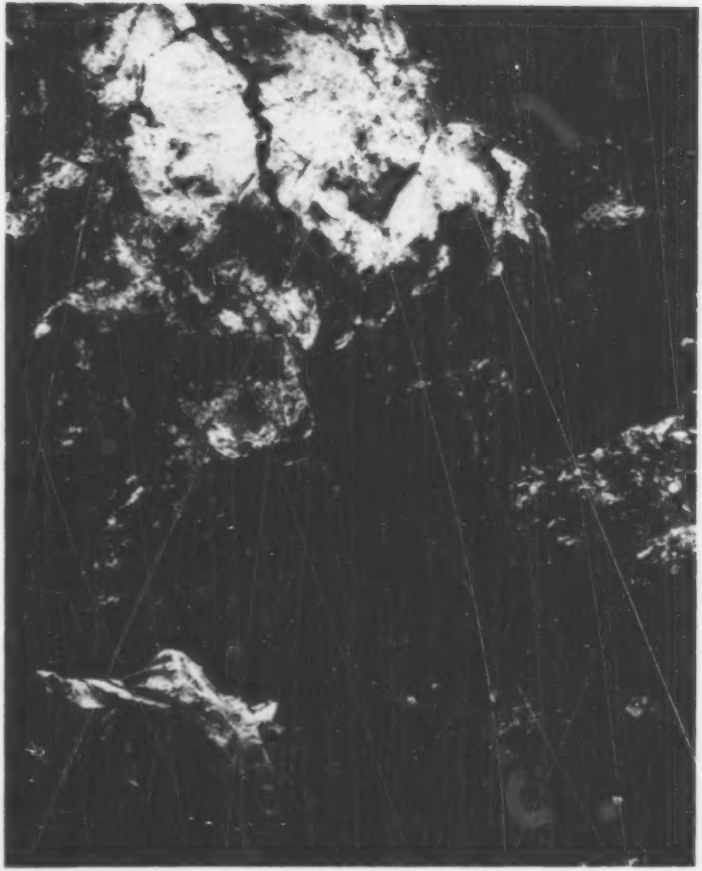
Lake View Nos. 1 and 2 mineral claims are owned by Messrs. Bibeau and McKay. To reach these claims the main trail up the south side of Glacier creek is followed for 1½ miles, where Bibeau and McKay's trail turns off to the left and follows up a small creek a distance of about three-quarters of a mile. The trail rises rapidly at first, but towards the top flattens out considerably. At an altitude of 2,200 feet above Bear river a quartz vein, outcropping in a small creek, has been prospected for a distance of 200 feet by trenches and open cuts sunk to the vein through two feet of peaty mould and two feet of broken slate. A shaft, 45 feet deep, has been sunk on the hanging wall and the vein was crosscut at 25 feet, where it is reported to have had a width of 52 inches, well mineralised with galena, blende and a little copper pyrites. The owners had to abandon the further sinking of the shaft last fall, owing to the amount of water, but it is proposed to continue this work during the coming winter, when water will not interfere so much and better provision will be made for handling it. Assays of the clean ore gave the following result per ton:—Gold, 0.08 oz.; silver, 44.0 oz.; lead, 16 %; zinc, 13.5 %.

North Side of Glacier Creek.

Stewart Mining & Development Co., Limited.

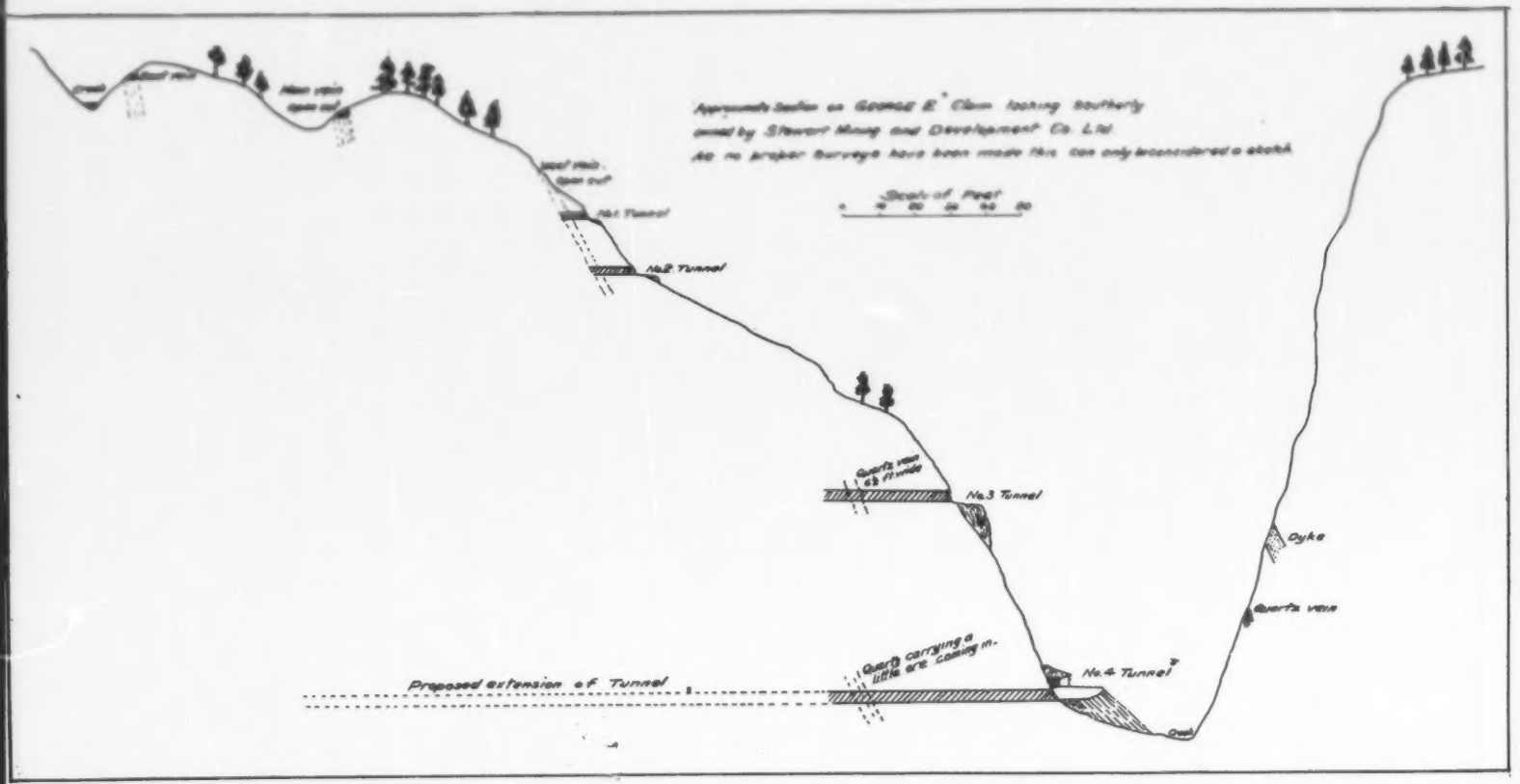
This company owns the following claims, situated on the north side of Glacier creek:—*Silver King*, *Silver King No. 1*, *Silver King Fraction*, *Sunbeam*, *Sundown*, *Ben Hur Fraction*, *Ben Hur* and *George E.* The claims are reached by following a trail up the north side of Glacier creek for a short distance and then swinging round to the north, the mine cabin being about 1¼ miles from the mouth of Glacier creek at an altitude of 1,100 feet. A large fracture and zone of movement in the country rock extends for the length of several claims in a north and south direction, in which several of the fissures formed by the movement are filled with quartz, forming quartz veins. There seems little reason to doubt that these are the same veins seen in the Portland Canal Company's properties, as they are traced by outcrops through the different claims into that company's ground. The principal work has been done on the *George E.* claim, where three distinct veins are to be seen, known locally as the "East vein," the "Main vein," and the "West vein." The fissuring of the country rock has formed a gulch over a hundred feet deep, with precipitous sides. This gulch extends for about 3,500 feet down to Glacier creek, the creek being 750 feet below the *George E* cabin. The quartz veins just mentioned outcrop on a ridge to the east of the gulch. The country rock is the argillite noted on the *Little Joe* claim of the Portland Canal Company.

The "East vein" outcrops on the bank of a creek running parallel to the big gulch and emptying into Glacier creek. A short tunnel and several open cuts expose a well defined quartz vein 7 feet wide, mineralised with pyrite, argentite and a little galena, and is reported to



TUNNEL, AMERICAN GIRL CLAIM.
The mouth of the tunnel is on the vein. Vein matter also shows above and to the left.

EAST VEIN, GEORGE E CLAIM.


Approximate Section on GEORGE E. Claim looking Southerly
owned by Stewart Mining and Development Co. Ltd.
As no proper Surveys have been made this can only be considered a sketch.
Scale of Feet
0 20 40 60 80
No.1 Tunnel
No.2 Tunnel
Quartz vein 6ft in width
No.3 Tunnel
Dyke
Quartz vein
Quartz carrying a little ore Casing in.
No.4 Tunnel
Proposed extension of Tunnel

carry values from $8 to $60 per ton. Samples taken by the Government Assayer assayed from 0.12 oz. in gold to 0.56 oz. in gold, and from 5.4 oz. in silver to 30 oz. in silver, per ton. The strike of the vein is N. 15° W., dipping about 77° to the west, the walls being well defined, but enough work has not been done to determine this with accuracy. A felsitic dyke occurs on the footwall similar to that see on the footwall of the *Little Joe* claim, an indication that it may be the same vein.

Some 50 feet west of the "East vein," what is locally known as the "Main vein," has been prospected by a series of open cuts. It is similar in character and mineralisation to the "East vein," but sufficient work has not yet been done to demonstrate its value.

On the brow of the hill, about 180 feet above the gulch, some open cuts show a quartz vein and a number of smaller quartz stringers, which are known as the "West vein." About 10 feet below the outcrop, No. 1 tunnel has been run in 6 feet crosscuting the vein, and showing a width of 2 feet 6 inches of quartz well mineralised with pyrites, a little galena, argentite and native silver. From an open cut 20 feet to the left of the tunnel high values are said to have been obtained.

Some 15 feet below No. 1 tunnel, another crosscut tunnel, known as No. 2, has been run 10 feet, cutting the quartz vein seen in the upper tunnel, which here is about 4 feet wide and has a quartz filling mixed with the slate country rock and some secondary calcite veinlets. The general formation twists and flattens out a little at this point, having an approximate dip of 42° to the S. W.

Sixty feet below this tunnel, No. 3 crosscut tunnel has been run in from the gulch a distance of 35 feet. At 27 feet in a quartz vein 6½ feet wide was crosscut, probably the same vein seen in the two tunnels above, as it has the same appearance, the quartz filling being mixed with slate. In the tunnel the strata shows considerable twisting, and on the walls there is a two-inch crushed zone of slate with a secondary filling of calcite. The quartz is mineralized with pyrites and a little galena. Samples taken by the Government Assayer gave gold, 0.52 oz.; silver, 1.48 oz. The values, however, will vary considerably, as native silver can be seen in some of the samples.

Sixty feet below No. 3 tunnel and some few feet above the bottom of the gulch, No. 4 tunnel is being run into the hillside, the portal of the tunnel being 250 feet vertically below the *George E.* cabin. This is intended as a prospect tunnel to crosscut, with about 180 feet of depth, the veins seen on the surface. The topography of the ground and the dip of the veins favour this mode of prospecting, and while there is barely sufficient data on which to base a calculation as to where these veins will be struck, yet the running of this long tunnel does not appear to be nearly so risky a proceeding as it is in many other prospects. It is expected that the "East vein" will be struck when the tunnel is in 240 or 250 feet.

When visited, the tunnel had been driven 54 feet in a S. 75° E. direction in a slate country rock, and a quartz impregnation, carrying a little iron and copper pyrites, was coming in and may prove to be the same vein seen in No. 3 tunnel.

On the opposite side of the gulch is a quartz vein 10 feet wide, but no work has been done on it.

Little Wonder.

The *Little Wonder* mineral claim, owned by Chapman and Ranch, of Stewart, is reached by following the creek down from near the outcrop of the "East vein" of the *George E.* until the south line of this claim is reached, and this forms the north boundary of the *Little Wonder* claim. It is more than likely that all the veins seen in the *George E.* claim extend into this ground; the "East vein" is easily traced, as it forms the bed of the creek for the most of the way; the "Main vein" has also been uncovered by a number of open cuts. At 100 feet from the south line of the

George E., and 300 feet vertically below the *George E.* cabin, an open cut shows the "East vein" to be 5 feet wide, with clean walls and a quartz filling mixed with slate and mineralised with iron pyrites and galena. The owners report that the following values were obtained from samples: gold values, $8 to $48 per ton; solid iron pyrites went $8 in gold and 4½ oz. in silver; eight inches of solid ore in the creek gave $48 in gold, 7½ oz. silver, and 4 % lead. The strike of the vein at this point is N. 35° W., and the dip 72° to the S. W.

O. K. Fraction. This fractional claim is owned by Joseph Perrault, of Stewart, and is an extension of the *Little Wonder* claim just mentioned. The "east vein" can again be easily traced along the bed of the creek and on the right bank until Glacier creek is reached, 750 feet vertically below the *George E.* cabin. A number of open cuts show this vein up as strongly as at any point where it outcrops. It is well mineralised with iron pyrites, argentite and native silver, but owing to the presence of native silver and argentite, the values are likely to be spotty. Samples taken by the Government Assayer assayed as follows: gold, 0.1 oz per ton; silver, 75.2 ozs. The *O. K. Fraction* extends across Glacier creek and joins the *Mosquito* claim, owned by the Portland Canal Mining Co., Ltd. Enough work has not been done to definitely determine the width of the vein where it crosses Glacier creek, but it is probably from 10 to 15 feet wide.

Main Reef Mineral Claims. To the northward over the hill from the *Sunbeam* claim, Ranch and Horseman have located the *Main Reef No. 1* and *No. 2*, and the vein seen on these claims may be one of those noted on the Stewart Mining Company's property, as it is in the same line and has similar features. The claims are reached by a trail 1½ miles from the Bear River valley, and are at an altitude of 1,300 feet above Glacier creek camp. A small creek has cut through the rock and shown up a fissure in a slate country rock. A tunnel 33 feet long has been run in on this fissure, which has a strike S. 75° E., a dip of 65° to the south, and is clearly defined, but is mostly filled with crushed slate, slightly impregnated with quartz, but where the quartz is in any quantity, it is heavily mineralised with iron pyrites and a little galena.

Some twisting and perhaps faulting of the strata has occurred along the line of the bed of the creek, as what appears to be the same vein is seen on the opposite bank 250 feet farther up the creek. Here a tunnel has been run in 30 feet on a fissure, which has the same features as noted on the other side, but the strike is S. 25° E. and the dip nearly vertical. A felsite dyke lies along the east side of the fissure.

The owners shipped four tons of ore from this tunnel, which gave them the following returns per ton:—Gold, 0.7 oz.; silver, 20.94 oz.; lead, 23 %. Such returns encourage further prospecting, in the hope that the filling of the fissure may change from crushed slate to ore, which it might do in a very short distance, as the crushing movement noted at this point may be purely local. Samples of galena and pyrites taken by the Government Assayer assayed as follows:—Gold, 0.3 oz.; silver, 51.2 oz.; copper, none; lead, 64.2 %.

Tyee. This claim is owned by Bibeau & McKay, of Stewart, and was formerly the *Mother Lode*. It is situated about a mile above Glacier creek and 300 feet vertically above Bear river. An ill-defined fissure in a granolitic rock,* about 3 feet wide, is filled with quartz and there are also a number of small stringers of quartz. An open cut 15 feet has crosscut this showing, and another short open cut 35 feet to the S. E.

---

* This specimen is a pinkish gray granolitic rock of medium texture. The only minerals distinguishable in the hand specimen are feldspar, which seems to make up the body of the rock, and black specks of some bisilicate mineral. In the thin section it is found to consist of feldspar, quartz and hornblende, and with which a small amount of biotite is intergrown and accessory amounts of sphene. The feldspar consists of orthoclase and of finely striated plagioclase, evidently of the oligoclase-andesine type. The rock is a hornblende-biotite-granite.

LOOKING UP LYDDEN CREEK, FROM RED CLIFF MINE DUMP.

has been run into the ore body. The quartz is well mineralised with iron pyrites and in places a little copper. Samples of the quartz and pyrites taken by the Government Assayer gave rather astonishingly high values, as follows:—Gold, 4.92 oz.; silver, 20.68 oz.

Tomboy. This claim, owned by Sutherland & Thomson, of Stewart, has been located on the main Bear River trail, 7½ miles from Stewart. The claim was only located this summer and a few shots have been put in on a quartz mineralisation in slate, on the left bank of Bear river. The mineralisation is about 8 feet wide and consists largely of pyrrhotite and a little iron pyrites. The assay values are low.

Roosevelt Group. This group, consisting of the *Roosevelt No. 1* and *No. 2*, *Pontiac*, *Miller*, *Northern Bell*, is owned by Rainie & Chambers, of Stewart, B. C., and is situated on Bitter creek, a tributary of Bear river, flowing in from the south-east, nine miles from the head of the canal. Bitter creek is a stream of considerable size, being one of the largest creeks flowing into Bear river, having its source in a large glacier and being also fed by minor streams. The claims are reached by following a trail up the right bank of the creek for five miles, then turning up a small tributary called Rainie creek for 1½ miles. The creek has cut deeply into a slate formation, and in this slate rock is a fissure which is partly filled with a felsite dyke four feet wide. To the left of this dyke is a zone of crushed slate largely impregnated with quartz, carrying iron and copper pyrites, a little galena, and a slight secondary filling of copper carbonate. A tunnel, 90 feet long, has been run in on this showing; for the first few feet quartz predominates and is 4 to 5 feet wide and carrying some values. There are good walls, the dyke forming the one to the right; the strike of the lead is N. 70° W., and the dip vertical. In the drift, 40 feet from the entrance, the quartz vein narrows to 14 inches and is not distinctly seen in a crosscut 8 feet further on, which has been run to cut it. From this crosscut to within a foot or two of the face is a crushed and slicken-sided zone of slate, carrying a few stringers of quartz and calcspar. There is a clean wall on the side of the dyke; the other wall is not so good. The face of the drift shows the same crushed slate zone, but with more quartz coming in. The elevation of the tunnel is 900 feet above the junction of Bitter creek and Bear River, and 1,400 feet above sea-level. The tunnel is on *Roosevelt No. 2*.

At a distance of 650 feet farther down the creek, and 50 feet vertically below the tunnel on *Roosevelt No. 2*, is a similar felsite dyke and crushed slate zone, the latter being filled with quartz and about 4 feet wide. The fissured zone lies in contact with the dyke and has been prospected by a drift 25 feet long. The quartz infiltration does not show up so well or permanently as in the No. 2 tunnel. The mineralisation consists of galena and blende, with a little iron and copper pyrites.

Samples taken by the Government Assayer gave the following returns: Upper tunnel—Gold, .28 gr.; silver, 1.8 oz.; copper, 5.6 %. Lower tunnel—Gold, .08 oz.; silver, 62.8 oz.; lead, 22.4 %; copper, 1.2 %.

Pasco and Independence. These claims are reached by a trail up the left bank of Bear river, and are situated on the left bank about 3½ miles above the junction of that river and American creek. The trail rises to avoid the canyon, but descends to the creek level at the *Independence* claim, which is only about 80 feet higher in altitude than the junction of Bear river and American creek. Some 40 feet back from the creek the rock rises at a high angle, and in this rock there is a vertical fissure which is mineralised with galena and a little copper glance. The rock is slickensided and crushed, and more or less interbanded with the ore. An open cut, 15 feet long, has been run into this showing, and in the bottom of the cut is a vein of steel galena 10 inches wide, with a further slight mineralisation on either side of it. The mineralised zone appears to pinch out at the top

of the cut and to widen at the bottom. The country rock is a fine-grained porphyrite. The strike of the fissure is S. 40° E., and some claims have been staked on what is believed to be a continuation of this fissure, on the opposite bank of the creek, the ore being of similar character. A sample of the galena gave the following assay:— Gold, 0.02 oz.; silver, 30.0 oz.; lead, 70.3 %.

American Creek.

Red Cliff Group.

American creek, an important tributary of Bear river, joins the latter some thirteen miles from the head of Portland canal. A considerable number of mineral claims have been staked on either side of the creek, many of which were only located this year. At the junction just mentioned a small stream flows in from the north-west, named Lydden creek, after one of the early prospectors; half a mile up this creek and 400 feet above Bear river, a group of five claims, known as the *Red Cliff* group, has been located. The names of the claims are *Mount Lyell*, *Red Cliff*, *Little Pat Fraction*, *Montrose* and *Waterloo*, owned by the Red Cliff Mining Company, of Vancouver, B. C., A. D. McPhee being Superintendent at the mine. Lydden creek flows along the base of a bare mountain, which rises with a slope of 55° to a height of about 5,000 feet. On the face of this mountain are easily seen numerous mineral stains having a general trend up and down the mountain. On the strongest of these mineral stains the *Red Cliff* claim was located, and a few shots disclosed a showing of copper gold ore; this has been further prospected by a tunnel in the same place and running directly into the mountain. The tunnel is 400 feet above Bear river and about 160 feet above Lydden creek; it has been driven 57 feet directly into the mountain, the course being S. 35° W. mag. A crosscut of 17 feet was made to the right to cut through a horse which was supposed to come in, but this has been stopped and the tunnel has been pushed 12 feet farther into the hill and is still being run, the total distance from daylight in a direct line being 67 feet.

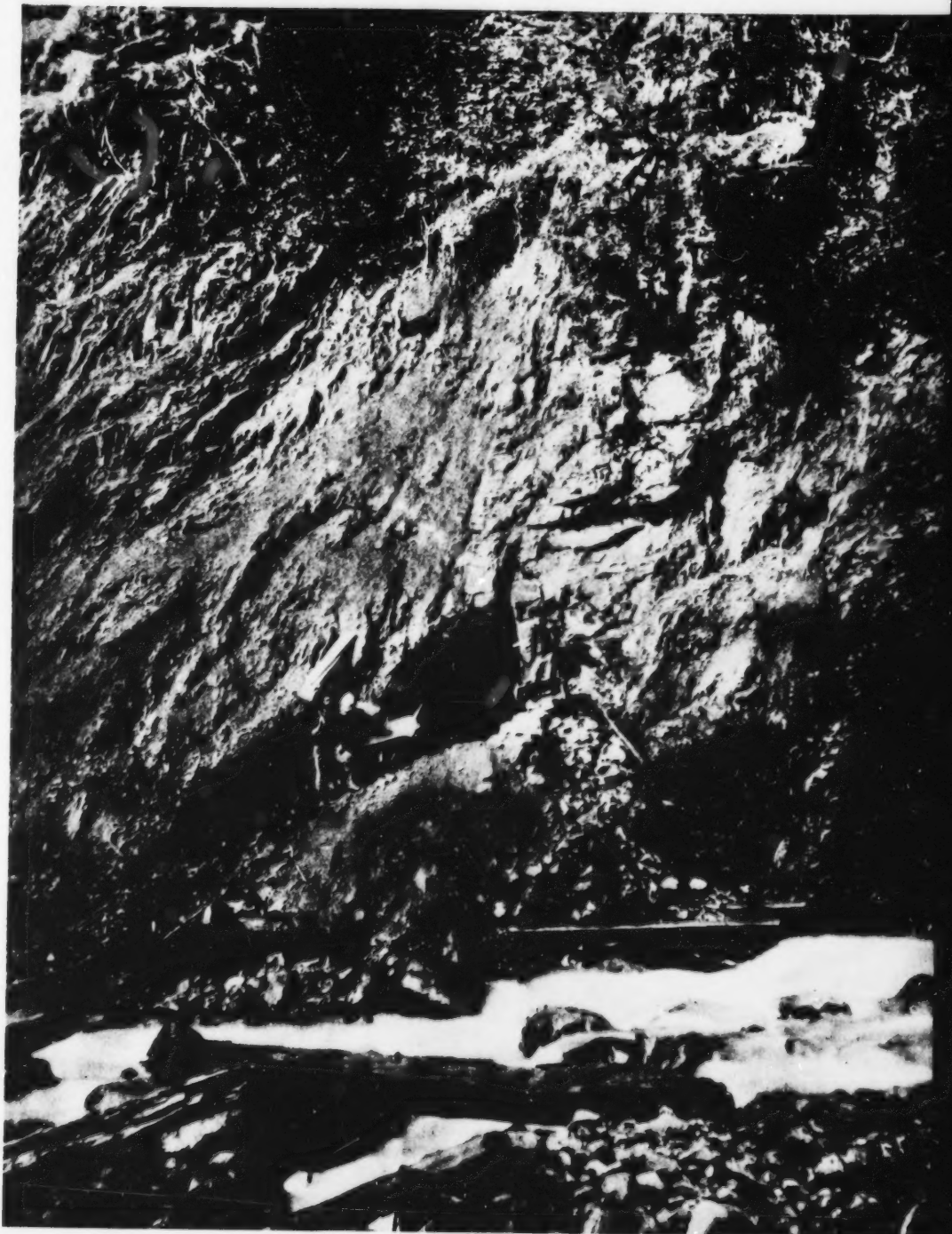
The tunnel and stripping which has been done show up a body of solid ore, which appears to be some 8 feet wide, but it has not been cut through in any place in the tunnel, the roof and left side being in good ore all the way, the right side of the tunnel being mineralized with iron pyrites without copper, but carrying low gold values. Some shots put in 100 feet above the tunnel show up ore the same as that noted below.

The ore body appears to occur in the form of a vein or veins in a greenstone country rock, the vein matter being a dark igneous rock matter interbanded and criscrossed with small quartz veinlets, the whole being mineralized with iron and copper pyrites; in some places the copper pyrites is in solid bands, five or six inches thick. The assays on this ore vary from 6 to 18 % copper, 0.3 to 1.8 oz. gold and 1.0 oz. of silver, the iron pyrites unmixed with copper pyrites carrying 0.3 oz. in gold, while selected specimens give much higher values.

The walls of the vein are tight; there is little evidence of any movement and none of any secondary deposits or enrichment. There are about 225 tons of ore on the dump.

The position of the present tunnel on the slope of the mountain renders work unsafe for eight or nine months in the year, on account of snow-slides, so the company has surveyed and intends to run a long working tunnel 387 feet lower down the hill, under the ore body that has been proved, which will render the working of the mine possible at all seasons of the year.

To the north-west of the *Red Cliff* is the *Little Pat Fraction*, on which there is a considerable surface showing, which has not yet been touched. Farther to the north-west the *Montrose* claim has been deeply cut by Lydden creek, and in this cut there is an exposure of ore similar to that seen on the *Red Cliff*, not showing so much copper but carrying high gold values. A mineralised face of some 25 feet square has been uncovered by surface work.



UPPER TUNNEL, ROOSEVELT CLAIM, SHOWING QUARTZ VEIN IN FACE OF BANK.

JUMBO CLAIM.
The vein matter covers the entire face of this cliff.

FALLS ON GLACIER CREEK.
To be used by Portland Canal Mining Co., Ltd.

At numerous places on the mountain side mineral stains are to be seen, but its precipitous nature renders prospecting difficult, and in some cases impossible.

Samples from the *Montrose* assayed as follows:—Gold, 6.8 ozs.; silver, 1.2 ozs.; copper, trace.

American Girl Group.

These claims are reached by a trail following up the right bank of American creek and are about four miles from the junction of the creek and Bear river. The trail is a very poor one, the first part of the way being in the bed of the creek, then taking a steep rise to avoid the canyon through which American creek flows it skirts the base of the mountain for the remainder of the distance, and must present at certain seasons considerable danger from snow-slides. The end of the trail zigzags up the face of a slide until the tunnel on the *American Girl* is reached, at an altitude of 2,200 feet, or 1,700 feet above the junction of American reek and Bear river. At the tunnel mouth the rock face is nearly perpendicular for some distance, and on this face a quartz vein some 14 feet wide is easily seen, striking, approximately, S. 60° W. and dipping at an angle of 60° to the south. The tunnel runs directly in the middle of the quartz vein into the mountain, in a S. 80° W. direction, continuing in this direction for 48 feet. At 33 feet from the mouth of the tunnel the vein swings to the left, the tunnel being in country rock; at 48 feet in, the tunnel also swings to the left for 56 feet more, until the last course is S. 20° E. Ore is not again seen until the face is reached, where a stringer of ore a foot wide has been crosscut, the ore being the same as in the main vein, and striking N. 50° W., with a dip of 70° to the south-east.

The vein matter is quartz, showing a brecciated rather than a banded structure, mineralized with blende, galena, stibnite, copper glance and a secondary enrichment of copper carbonates. It is also probable that argentite occurs in places, as high silver values occasionally occur. The country rock near the vein is a trap, although the most of the float from farther up the mountain is a distinct porphorite, mixed with red jasper.

OBSERVATORY INLET.

Observatory inlet is a branch of Portland inlet running practically parallel with Portland canal but fifteen or twenty miles apart. Thirty-five miles from the entrance, Observatory inlet splits into two arms, viz., Hastings and Alice arms, the former heading north and south and Alice arm east and west. Goose bay is a large sheltered inlet, the outlet being on the west shore of Observatory inlet, at the entrance to Hastings arm. While there is a deep waterway of ample width, no detailed survey has been made of these waters and the chart should be used with caution.

Hidden Creek Copper Co.

This company owns nine mining claims in the neighbourhood of Goose bay, viz.: *Rudge*, *Revenge*, *Donald*, *Alpha*, *Manson*, *McKinley*, *Kenneth*, *Salamander* and *Bunker*. The principal work has been done on the *Alpha* and *Revenge*, and there is an excellent plank road two miles long extending from the deep water of Goose bay to the main tunnel, which is 530 feet above sea level.

Prospectors were first attracted by a round-topped hill, about 1,000 feet high, which was more or less covered by a typical "gossan" or iron cap. Prospecting showed that this gossan was thicker and more strongly marked in some places than others, and attention was specially directed to these points. The first of this work was done on a large exposure of these oxidized ores, which proved to be five feet thick. This gossan was cut with a number of trenches which disclosed a body of mixed pyrite and chalcopyrite ore, and this was prospected by four tunnels, aggregating 200 feet. These tunnels developed a large body of ore carrying 4 % to 6 % copper, which was called the "Cabin Bluff," and is at an altitude of 700 feet.

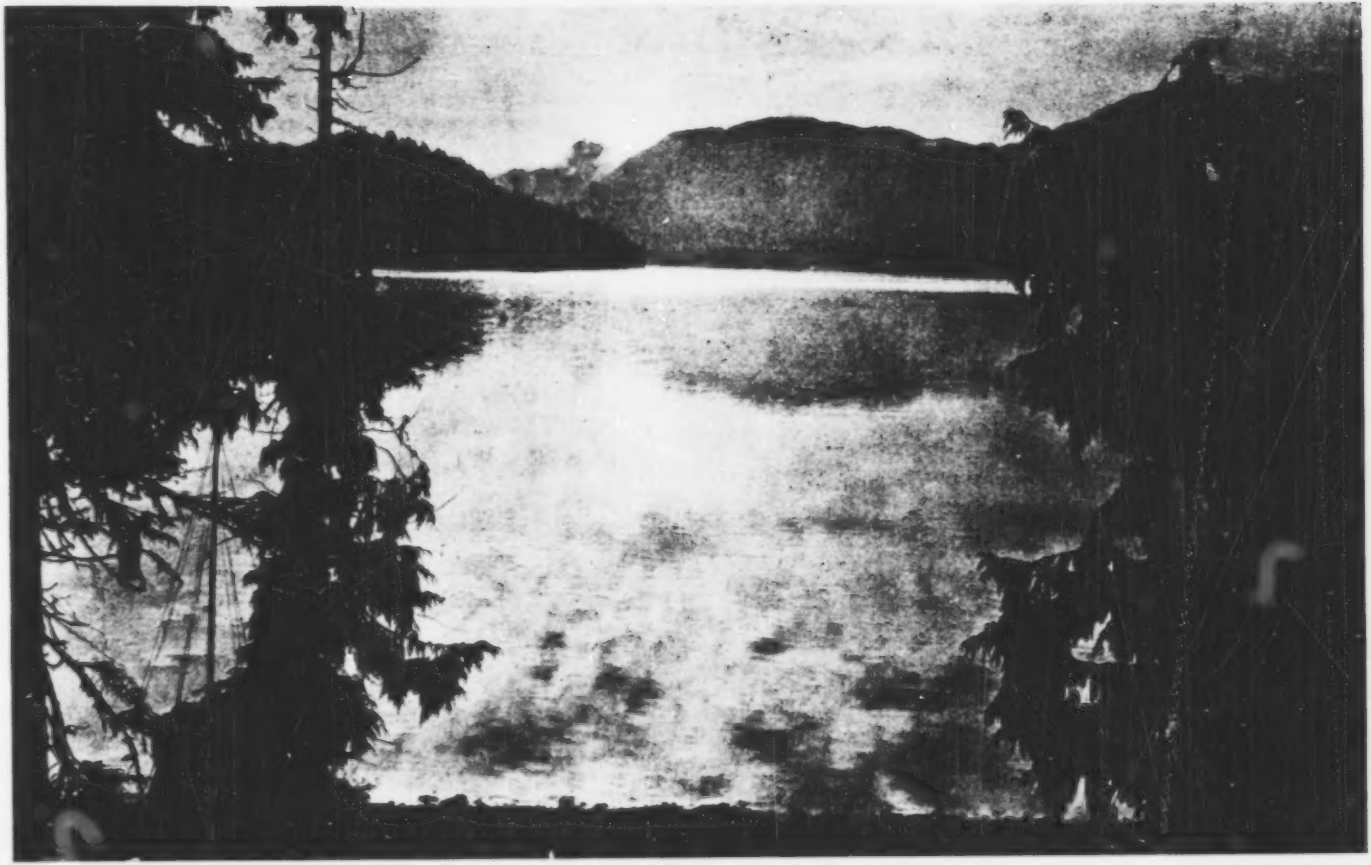
About 500 feet back round the hill and 200 feet higher than the "Cabin Bluff," another and larger exposure of ore was discovered and named the "Mammoth Bluff." This has been cleared off to a large extent by surface stripping and shows a height of 300 feet of mixed pyrite and chalcopyrite ore, carrying 4½ % to 5 % of copper. This ore deposit has been prospected by several tunnels, in all 350 feet in length.

There are several smaller showings on this hill, and these, with the "Cabin" and "Mammoth" bluffs, have been prospected by 2,000 feet of open cut, besides the tunnels. To tap these ore bodies at depth and form a main working tunnel, a long drift has been started on the hillside 200 feet vertically below the "Cabin Bluff," and when the property was visited this drift was in 732 feet. At 480 feet in, the ore seen in the "Cabin Bluff" above was struck, the tunnel cutting through it, the strike of the ore being N. 10° W., dip 65° W. The thickness of the ore body is estimated at from 25 to 40 feet, running from 4% to 5% copper. Drifts 70 feet long have been run on either side of the tunnel in ore all the way, the direction of the tunnel being 90° from the strike of the ore.

Round the hill to the south 265 feet, and at an elevation of 100 feet above the main tunnel, a drift known as the "Pyrites tunnel" is being run in to connect with an upraise from the main tunnel. For the first 100 feet this tunnel runs through loose granular pyrites, made up of small detached iron pyrites crystals similar to those found on the *Ecstall* pyrites deposit near the Skeena river. At 100 feet in, solid mixed iron and copper pyrites ore was struck, carrying 4% copper for ten feet, when a lower grade iron sulphide ore was met, and the tunnel is still in this ore at 200 feet from the portal.

The vertical height between the main tunnel and the top of the "Mammoth Bluff" deposit is 450 feet, and with the prospecting done it is reasonable to infer that the ore chute

LOOKING UP BITTER CREEK.



GOOSE BAY, OBSERVATORY INLET.

is continuous for this vertical distance. The horizontal boundaries of this ore body have not been clearly defined, but it is probably some 600 feet in length by 20 to 25 feet in thickness, carrying 3% to 4% copper.

At the "Cabin Bluff" showing there is a considerable depression in the ground, which appears to have been caused by the oxidising and dissolving out of the pyrites ore-body, and there is a large deposit of hæmatite in a small flat of ten acres south of the ore showings, where this dissolved out ore has been re-deposited. Samples of this deposit gave the following assay: Iron, 60%; gold, 0.10 oz.; copper, 0.2%.

The country rock in the vicinity of the ore-body is made up of altered argillites or shales, traversed by felsite, diabase and porphorite dykes, these dykes being of later origin than the ore. In some parts of the deposits there is a vein filling of quartz, but the main body is composed of solid sulphide ores.

There is an 87-foot water-fall on a small creek 1¾ miles northward of the main tunnel, where 600 horse-power is developed by an impact wheel of Pelton type. This runs an 8-drill Rand compressor and also a small saw-mill capable of cutting 7,000 feet a day of rough lumber.

Transportation facilities are being provided by the installing of 2,500 feet of gravity tramway and one mile of an electric tramroad on a seven-tenths of one per cent. grade. This will bring the ore to deep water, where it can be shipped to any of the coast smelters.

The property is under the general direction of Mr. M. K. Rodgers, American Bank Building, Seattle.

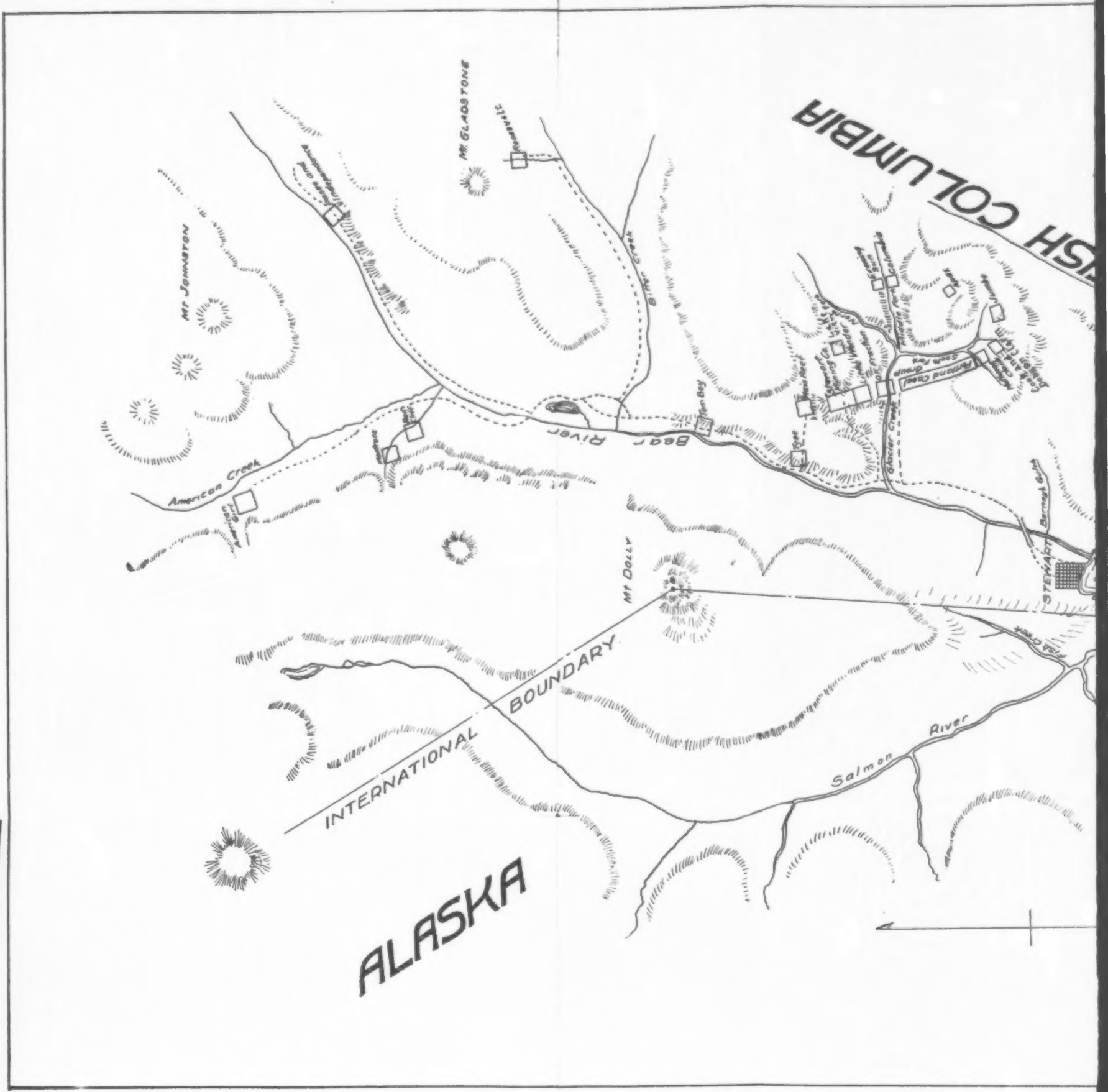
SUMMARY.

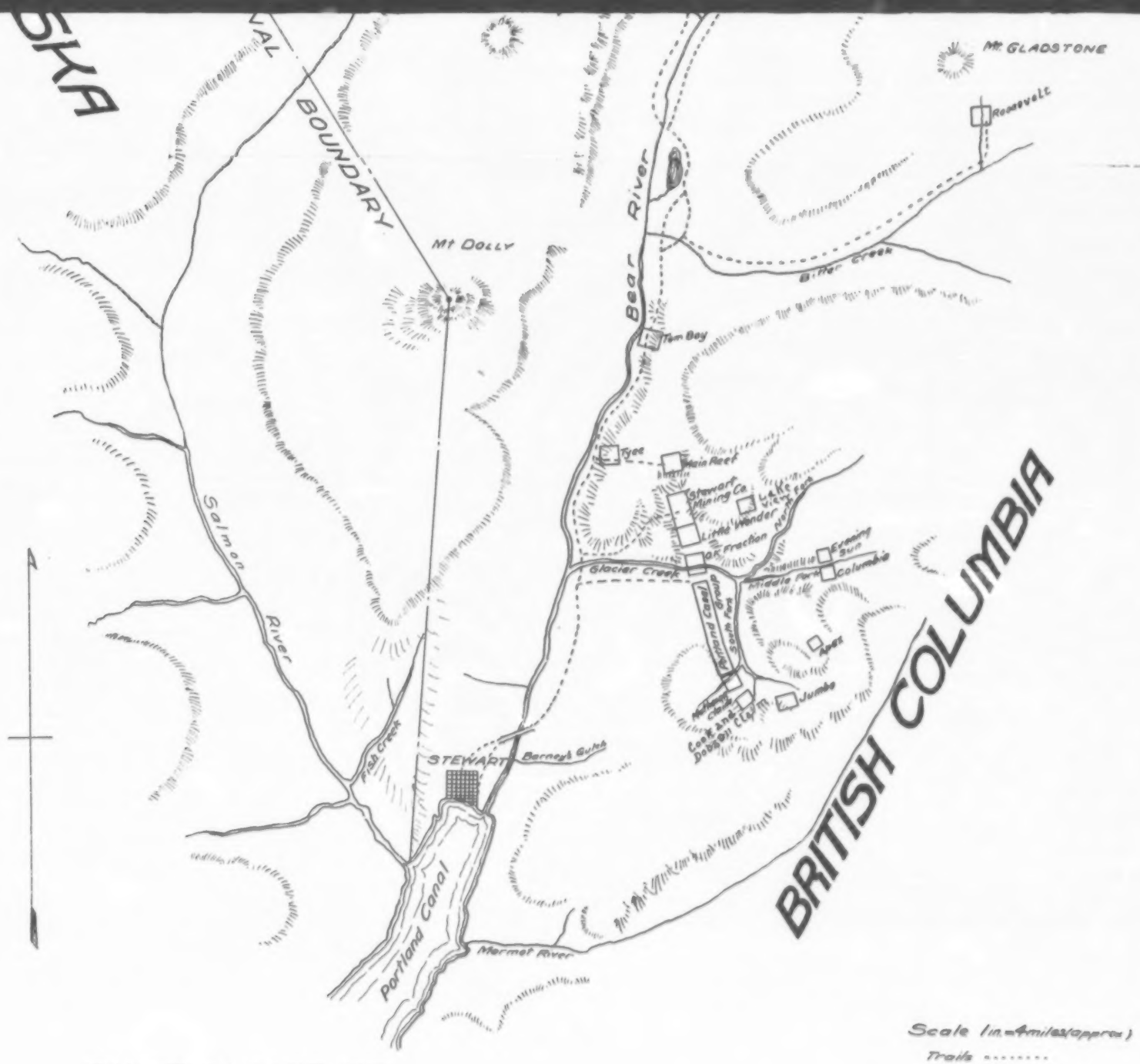
Since the Portland canal district was examined, three years ago, a considerable amount of development work has been done, with results that have been quite encouraging. The veins have proved permanent in character and have given returns which were very satisfactory. The results obtained by the development work done on the *Little Joe* vein serve as an indication of what may be expected by the opening up of other prospects having fissures of a similar character. A number of such prospects have as good surface showings as could be seen on the *Little Joe* three years ago, and there is every reason to hope that, with equal development work, they will become quite as valuable properties.

There still remains ample ground that either has not been prospected at all or only in a very hurried and superficial manner, and the country at the head of Bear river and between Bear river and American creek seems to promise a return for careful prospecting. The districts at the head of Salmon river and Marmot river have also hardly been touched, while much unknown ground lies at the head of Hastings arm of Observatory inlet.

The Government has dealt generously with the district in providing transportation facilities, and the outlook for this section of the Province is such that there is every reason to believe that the faith thus shown has not been misplaced.

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, I.S.O., V.D., Printer to the King's Most Excellent Majesty.
1903.


ISH COLUMBIA
Mt. GLADSTONE
Mt JOHNSTON
Bear Creek
Bear River
Glacier Creek
American Creek
Mt OOLITE
INTERNATIONAL BOUNDARY
Salmon River
ALASKA



Scale 1 in. = 4 miles (approx.)

Trails .....

SKETCH MAP OF

BEAR RIVER MINING DISTRICT

PORTLAND CANAL

B.C.